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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
JOHN A HUGHES, ET AL.	: EXAMINER: MAUREEN GRAMAGLIA
SERIAL NO: 10/673,376	:
FILING DATE: SEPTEMBER 30, 2003	: GROUP ART UNIT: 1792
FOR: METHOD AND SYSTEM FOR INTRODUCTION OF AN ACTIVE MATERIAL TO A CHEMICAL PROCESS	:

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal of the final Office Action dated August 11, 2009. A Notice of Appeal was filed December 11, 2009.

TABLE OF CONTENTS

I. Real Party of Interest

The real party of interest in this appeal is the assignee Tokyo Electron Limited of Tokyo, Japan.

II. Related Appeals and Interferences

Appellants, Appellants' legal representative, and the Assignee are aware of no appeals which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. Status of Claims

Claims 1, 3, 11, 18, 20, 22, and 40-43 are presently active. Claims 2, 4-10, 12-17, 19, 21, and 23-26 are withdrawn. Claims 27-39 were canceled without prejudice. Claims 1, 3, 11, 18, 20, 22, and 40-43 are appealed.

IV. Status of Amendments

An Amendment was filed on May 1, 2009, which resulted in the final Office Action dated August 11, 2009. A Pre-Appeal Brief Conference Request was filed December 11, 2009, which resulted in the Notice of Panel Decision from Pre-Appeal Brief Review mailed January 1, 2010.

V. Summary of Claimed Subject Matter[1]

Claims 1 and 18 are the independent claims appealed. Claim 1 sets forth a processing element for a semiconductor manufacturing system, the processing element comprising:

> a cylindrical unit including a passive polymeric component and an active component;
>
> said cylindrical unit having a first radially-extending surface and a second radially extending surface opposite the first radially-extending surface, wherein an inside diameter of the cylindrical unit forms an opening for disposition of the cylindrical unit around a substrate position in the semiconductor manufacturing system and the second radially extending surface is a substantially planar surface for disposition on a substrate holder in the semiconductor manufacturing system;
>
> said passive polymeric component configured to erode when exposed to a plasma process in said semiconductor manufacturing system; and
>
> said active component included as a part of said passive component and configured to alter the chemistry of the processing when exposed to the plasma process.

The following claim charts provide at least some of the sections from Appellants' specification which provide support for the claim elements in Claims 1 and 18.

[1] It is Appellants' understanding that, under the rules of Practice before the Board of Patent Appeals and Interferences, 37 C.F.R. §41.37(c) requires that a concise explanation of the subject matter recited in each independent claim be provided with reference to the specification by page and line numbers and to the drawings by reference characters. However, Applicants' compliance with such requirements anywhere in this document should in no way be interpreted as limiting the scope of the invention recited in all pending claims, but simply as non-limiting examples thereof.

Claim 1	**Support in U.S. Pat. Appl. No. 10/673,376**
1. A processing element for a semiconductor manufacturing system, said processing element comprising:	Specification, numbered paragraph [0007]: Accordingly, in one aspect of the present invention a processing element is configured to affect a chemical process in a semiconductor manufacturing system. The processing element including a passive component configured to be coupled to a semiconductor manufacturing system and configured to erode when exposed to a chemical process in the semiconductor manufacturing system. The processing element includes an active component coupled to the passive component and configured to alter the chemistry of the chemical process when the active component is exposed to the chemical process.
a cylindrical unit including a passive polymeric component and an active component;	Figures 1 and 7A Specification, numbered paragraph [0029]: Referring again to FIG. 1, the semiconductor manufacturing system 1 further includes one or more processing elements 50 coupled to the processing chamber 10. Additionally, the one or more processing elements 50 includes one or more exposed surfaces that are exposed to or are in contact with a chemical process in processing region 5. The one or more processing elements 50 can, for example, constitute a process unit that can be periodically replaced wholly, or part-by-part. At least one of the one or more processing elements 50 includes a passive component and at least one active component. The active component is configured to affect a change in the chemistry upon exposure to the chemical process. For example, the active component can provide at least one of reaction promotion, reaction inhibition, creation of a protective skin on a feature, polymer strengthening, and polymer weakening.

said cylindrical unit having a first radially-extending surface and a second radially extending surface opposite the first radially-extending surface,	Figures 5, 6A and 6B Specification, numbered paragraph [0059]: Alternately, for example, the cross-sectional geometry of the processing element can be varied in order to affect the amount of surface area exposed to the processing plasma as a function of time. FIG. 7A shows a cross-sectional view of processing element 50, wherein FIG. 7B and FIG. 7D present two alternatives for the geometrical shape of the exposed surface 150. In FIG. 7B, the exposed surface 50 is the cylindrical inner surface of processing element 50 as depicted in FIG. 7A. As the processing element erodes radially outward, the exposed surface area increases with time (by redial erosion outwards) as shown in FIG. 7C. Alternatively, in FIG. 7D, the exposed surface 150 includes a groove structure formed on the cylindrical inner surface of processing element 50 in FIG. 7A. As the processing element 50 erodes radially outward, the exposed surface area remains substantially constant with time (or erosion) as shown in FIG. 7E.
wherein an inside diameter of the cylindrical unit forms an opening for disposition of the cylindrical unit around a substrate position in the semiconductor manufacturing system and the second radially extending surface is a substantially planar surface for disposition on a substrate holder in the semiconductor manufacturing system;	Figures 1-5 Specification, numbered paragraph [0029]: Referring again to FIG. 1, the semiconductor manufacturing system 1 further includes one or more processing elements 50 coupled to the processing chamber 10. Additionally, the one or more processing elements 50 includes one or more exposed surfaces that are exposed to or are in contact with a chemical process in processing region 5.

said passive polymeric component configured to erode when exposed to a plasma process in said semiconductor manufacturing system; and	Figure 6B Specification, numbered paragraph [0049]: Referring now to FIG. 6A, a cross-sectional view of processing element 50 is illustrated. Processing element 50 includes a passive component 100 and an active component 110. For example, the passive component 100 can be an inert binding medium that is designed to bind, or embed, the active component 110. As processing element 50 erodes in time as illustrated in FIG. 6B, the active component 110 can become exposed to the chemical process, such as a plasma, and hence becomes active in the chemical composition of the chemical process of for example the plasma.
said active component included as a part of said passive component and configured to alter the chemistry of the processing when exposed to the plasma process.	Figure 6B Specification, numbered paragraph [0050]: The passive component 100 includes in one embodiment of the present invention a binding medium that may, for example, include a solid such as a polymer, a porous polymer, or a foam, or it may, for example, include a non-Newtonian fluid such as a gel. The active component 110 can be a material either in solid form, such as a powder or small particles, or in liquid form. In one example, when the active component 110 includes small particles, the passive component 100 can be a polymer. The small particles may be dispersed within a polymer such as Kapton, polyimide, ultem, amorphous carbon, Teflon, Peek, thermoplastic polymer, thermoset polymer, or sol-gel, ceramic, or glass. For example, U.S. Pat. No. 4,997,862, the entire contents of which are incorporated by reference, describes a process for preparing a mixture of colloidal particles in a resin matrix. Alternatively, in another example, when the active component 110 is a liquid additive, the passive component 100 can be a porous polymer, or a foam. For example, U.S. Pat. No. 6,436,426, the entire contents of which are incorporated by reference, describes a process for producing porous polymer materials. The active component 110 being in this embodiment of the present invention injected into the pores of the passive component 100.

Claim 18	**Support in U.S. Pat. Appl. No. 10/477,759**
18. A semiconductor manufacturing system for processing a substrate using a plasma process, comprising:	Specification, numbered paragraph [0008]: In another aspect of the present invention, a semiconductor manufacturing system for processing a substrate using a chemical process includes a processing chamber configured to facilitate the chemical process, a substrate holder coupled to the processing chamber and configured to support the substrate; a gas distribution system coupled to the processing chamber and configured to introduce a process gas to the processing chamber; a plasma source coupled to the processing chamber and configured to generate a plasma in the processing chamber, and at least one processing element coupled to at least one of the processing chamber, the substrate holder, the gas distribution system, and the plasma source. The at least one processing element includes a passive component configured to erode when exposed to the chemical process in the semiconductor manufacturing system, and includes an active component coupled to the passive component and configured to alter the chemistry of the chemical process when the active component is exposed to the chemical process.

a processing chamber configured to facilitate said plasma process;	Figure 1 Specification, numbered paragraph [0028]: Referring now to the drawings, wherein like reference numerals designate identical, or corresponding parts throughout the several views, and more particularly to FIG. 1, a semiconductor manufacturing system 1 is depicted in FIG. 1 including a processing chamber 10, a plasma source 15 coupled to the processing chamber 10 and configured to generate a plasma in a processing region 5 in the processing chamber 10, a substrate holder 20 coupled to the processing chamber 10 and configured to support a substrate 25, a process gas distribution system 40 coupled to the processing chamber 10 and configured to introduce process gas to processing region 5, and a pumping system 45 coupled to the processing chamber 10 and configured to alter the pressure of processing region 5 in processing chamber 10. For example, processing chamber 10 can facilitate processing substrate 25 at an elevated pressure, at atmospheric pressure, or at a reduced (vacuum) pressure. Moreover, for example, processing chamber 10 can facilitate the use of a plasma to perform a dry plasma etch process, wherein a pattern formed in a mask layer (such as a pattern formed in a light-sensitive layer using micro-lithography) is transferred to an underlying film on substrate 25. The semiconductor manufacturing system 1 can be configured to process various substrates (e.g., 100 mm, 125 mm, 150 mm, 200 mm, 300 mm diameter substrates, or larger).
a substrate holder coupled to said processing chamber and configured to support said substrate;	FIG. 1. See above.

a gas distribution system coupled to said processing chamber and configured to introduce a process gas to said processing chamber;	FIG. 1. See above.
a plasma source coupled to said processing chamber and configured to generate a plasma in said processing chamber;	FIG. 1. See above. See also numbered paragraph [0033] which states: As shown in FIG. 2, substrate holder 20 includes an electrode through which RF power is coupled to plasma in processing region 5. For example, substrate holder 20 can be electrically biased at an RF voltage via the transmission of RF power from RF generator 30 through impedance match network 32 to substrate holder 20. The RF bias can serve to heat electrons to form and maintain the plasma. In one configuration, the system can operate as a reactive ion etch (RIE) reactor, where the chamber and upper gas injection electrode serve as ground surfaces. A typical frequency for the RF bias can range from 1 MHz to 100 MHz and is preferably 13.56 MHz.

at least one processing element coupled to at least one of said processing chamber, said substrate holder, said gas distribution system, and said plasma source; and	Figure 1 Specification, numbered paragraph [0029]: Referring again to FIG. 1, the semiconductor manufacturing system 1 further includes one or more processing elements 50 coupled to the processing chamber 10. Additionally, the one or more processing elements 50 includes one or more exposed surfaces that are exposed to or are in contact with a chemical process in processing region 5. The one or more processing elements 50 can, for example, constitute a process unit that can be periodically replaced wholly, or part-by-part. At least one of the one or more processing elements 50 includes a passive component and at least one active component. The active component is configured to affect a change in the chemistry upon exposure to the chemical process. For example, the active component can provide at least one of reaction promotion, reaction inhibition, creation of a protective skin on a feature, polymer strengthening, and polymer weakening.
said at least one processing element comprising, a cylindrical unit including a passive polymeric component and an active component,	Figures 1 and 7A Specification, numbered paragraph [0029]: Referring again to FIG. 1, the semiconductor manufacturing system 1 further includes one or more processing elements 50 coupled to the processing chamber 10. Additionally, the one or more processing elements 50 includes one or more exposed surfaces that are exposed to or are in contact with a chemical process in processing region 5. The one or more processing elements 50 can, for example, constitute a process unit that can be periodically replaced wholly, or part-by-part. At least one of the one or more processing elements 50 includes a passive component and at least one active component. The active component is configured to affect a change in the chemistry upon exposure to the chemical process. For example, the active component can provide at least one of reaction promotion, reaction inhibition, creation of a protective skin on a feature, polymer strengthening, and polymer weakening.

said cylindrical unit having a first radially-extending surface and a second radially extending surface opposite the first radially-extending surface,	Figures 5, 6A and 6B Specification, numbered paragraph [0059]: Alternately, for example, the cross-sectional geometry of the processing element can be varied in order to affect the amount of surface area exposed to the processing plasma as a function of time. FIG. 7A shows a cross-sectional view of processing element 50, wherein FIG. 7B and FIG. 7D present two alternatives for the geometrical shape of the exposed surface 150. In FIG. 7B, the exposed surface 50 is the cylindrical inner surface of processing element 50 as depicted in FIG. 7A. As the processing element erodes radially outward, the exposed surface area increases with time (by redial erosion outwards) as shown in FIG. 7C. Alternatively, in FIG. 7D, the exposed surface 150 includes a groove structure formed on the cylindrical inner surface of processing element 50 in FIG. 7A. As the processing element 50 erodes radially outward, the exposed surface area remains substantially constant with time (or erosion) as shown in FIG. 7E.
wherein an inside diameter of the cylindrical unit forms an opening for disposition of the cylindrical unit around a substrate position in the semiconductor manufacturing system and the second radially extending surface is a substantially planar surface for disposition on a substrate holder in the semiconductor manufacturing system,	Figures 1-5 Specification, numbered paragraph [0029]: Referring again to FIG. 1, the semiconductor manufacturing system 1 further includes one or more processing elements 50 coupled to the processing chamber 10. Additionally, the one or more processing elements 50 includes one or more exposed surfaces that are exposed to or are in contact with a chemical process in processing region 5.

said passive polymeric component configured to erode when exposed to a plasma process in said semiconductor manufacturing system, and	Figure 6B Specification, numbered paragraph [0049]: Referring now to FIG. 6A, a cross-sectional view of processing element 50 is illustrated. Processing element 50 includes a passive component 100 and an active component 110. For example, the passive component 100 can be an inert binding medium that is designed to bind, or embed, the active component 110. As processing element 50 erodes in time as illustrated in FIG. 6B, the active component 110 can become exposed to the chemical process, such as a plasma, and hence becomes active in the chemical composition of the chemical process of for example the plasma.
said active component included as a part of said passive component and configured to alter the chemistry of the processing when exposed to the plasma process.	Figure 6B Specification, numbered paragraph [0050]: The passive component 100 includes in one embodiment of the present invention a binding medium that may, for example, include a solid such as a polymer, a porous polymer, or a foam, or it may, for example, include a non-Newtonian fluid such as a gel. The active component 110 can be a material either in solid form, such as a powder or small particles, or in liquid form. In one example, when the active component 110 includes small particles, the passive component 100 can be a polymer. The small particles may be dispersed within a polymer such as Kapton, polyimide, ultem, amorphous carbon, Teflon, Peek, thermoplastic polymer, thermoset polymer, or sol-gel, ceramic, or glass. For example, U.S. Pat. No. 4,997,862, the entire contents of which are incorporated by reference, describes a process for preparing a mixture of colloidal particles in a resin matrix. Alternatively, in another example, when the active component 110 is a liquid additive, the passive component 100 can be a porous polymer, or a foam. For example, U.S. Pat. No. 6,436,426, the entire contents of which are incorporated by reference, describes a process for producing porous polymer materials. The active component 110 being in this embodiment of the present invention injected into the pores of the passive component 100.

VI. Grounds of Rejection to be Reviewed on Appeal

Claims 1, 3, 11, 18, 20, 22, and 40-43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,556,500 to Hasegawa et al in view of Kumar et al (U.S. Pat. No. 7,227,097).

VII. Arguments

A. With regard to independent Claims 1 and 18, Hasegawa et al teach away from the claimed passive polymeric component configured to erode when exposed to a plasma process in the semiconductor manufacturing system

The Court in In re Gurley, 31 USPQ2d 1130 (Fed. Cir. 1994) explained the legal standard for teaching away as follows:

> A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or ***would be led in a direction divergent from the path that was taken by the applicant***. The degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant. [Emphasis added.]

Claim 1 as presently pending defines:

> 1. A processing element for a semiconductor manufacturing system, said processing element comprising:
> a cylindrical unit including a passive polymeric component and an active component;
> said cylindrical unit having a first radially-extending surface and a second radially extending surface opposite the first radially-extending surface, wherein an inside diameter of the cylindrical unit forms an opening for disposition of the cylindrical unit around a substrate position in the semiconductor manufacturing system and the second radially extending surface is a substantially planar surface for disposition on a substrate holder in the semiconductor manufacturing system;
> said passive ***polymeric*** component configured to ***erode when exposed to a plasma process in said semiconductor manufacturing system***; and
> said active component included as a part of said passive component and configured to alter the chemistry of the processing when exposed to the plasma process. [Emphasis added.]

Hasegawa et al clearly state at col. 1, lines 25-33, that:

> A focus ring (electric field compensating ring) is provided to surround the wafer on the lower electrode, thereby to effectively direct the reactive ions onto the wafer. It ***is necessary*** that the focus ring have anti-corrosion properties ***(anti-chemical properties with high resistance to etching gas)***, anti-plasma properties, heat resistance and electrical conductivity.

Hasegawa et al, at col. 9, lines 36-47, also state:

> As has been described above, the in-plane uniformity of etching characteristics such as etching rate and etching anisotropy can be improved by employing the focus ring 102 comprising a compound structure of inner and outer parts 104 and 106 and selecting the specific materials of the inner and outer parts. The inner part is formed of an electrically conductive material, e.g. amorphous carbon, ***which causes substantially no reaction product by contact with an etching gas***, or an electrically conductive material which does not cause, at least, any reaction product which is substantially adsorbed on an etching target, by contact with an etching gas. The outer part is formed of a material containing a component which is a main component of the etching target and ***causes such a reaction product as to be substantially adsorbed on the etching target*** by contact with an etching gas, preferably, a metallic material.

Here, the description here of an amorphous carbon "which causes substantially no reaction product by contact with an etching gas" or the material of the outer part "which . . . causes such a reaction product as to be substantially adsorbed on the etching target by contact with an etching gas, preferably, a metallic material" also in no way discloses or suggests and indeed teaches away from an erodable focus ring component.

Thus, the polymeric, erodible properties of the claimed cylindrical unit are the **opposite** of the electrical conductive, resistant to etching gas properties of the focus ring(s) in Hasegawa et al.

Here, for all these teachings in Hasegawa et al, a person of ordinary skill, upon reading Hasegawa et al, would be led in a direction divergent from the path that was taken by the applicant (i.e., would be lead away from the claimed ***polymeric*** component ***configured to erode*** when exposed to a plasma process in said semiconductor manufacturing system).

Thus, Hasegawa et al teach away from the claimed invention which is an indicia of non-obviousness.

B. With regard to independent Claims 1 and 18, the proposed modification suggested by the Examiner to modify the embodiment of Figure 1 or Figure 8 of Hasegawa is without a rationale as to why it is the focus ring of Hasegawa that is being modified.

In the outstanding final Office Action, the Examiner indicated that:

> In regard to Claims 1, 3, 11, 18, 20, 22, 40, and 42, it would have obvious to one of ordinary skill in the art to modify the embodiment of either Figure 1 or Figure 8 of Hasegawa et al. to substitute a cylindrical ring-shaped element comprising a passive polymeric component, and an active component comprising a distribution of solid particles encapsulated within the passive component, the active component configured to alter the chemistry of the processing when exposed to the plasma process, as taught by Kumar et al., for any of the cylindrical ring-shaped elements 104 and/or 106 of Figure 1, or the entire cylindrical ring-shaped element 102 formed by elements 104 and 106, and/or the cylindrical ring-shaped element 208d of Figure 8 of Hasegawa et al. The motivation for making such a modification, as taught by Kumar et al. (see at least Column 11, Lines 1-54), would have been to allow for the delivery of any desirable additive that a user wishes to add to the plasma, including a plasma catalyst or dopant.

Yet, this explanation comes without any articulated rationale as to why it is the focus ring element of Hasegawa et al that would have been modified in order to "allow for the delivery of any desirable additive that a user wishes to add to the plasma." Indeed, Kumar et al teach the introduction of their "plasma catalyst" into a region where the plasma catalyst "can cooperate with the microwave radiation in the presence of a gas to form a plasma" and "to improve, relax, the environmental conditions required to ignite a plasma." See col. 2, lines 2-15, of Kumar et al. Moreover, to accomplish this end, Kumar et al teach to add the "plasma catalyst" either by gas transport of powder 75 containing the catalyst into plasma cavity 60 (as show in Figure 2 of Kumar et al) or the feeding of a plasma catalyst sheet 170

longitudinally into the plasma cavity 165 (as show in Figure 6 of Kumar et al). Neither of which would suggest or imply to replace the focus ring with the "plasma catalyst" of Kumar et al.

Accordingly, when the teachings of Kumar et al are considered as a whole, one of ordinary skill in the art would have no proper motivation to substitute the "plasma catalyst" of Kumar et al at a focus ring position of Hasegawa et al. Only by impermissible hindsight gained by benefit of Appellant's specification would there be any reason to "choose" to alter the focus ring of Hasegawa et al.

> *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975) (***the particular placement of a contact in a conductivity measuring device*** was held to be an obvious matter of design choice). However, "the mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, ***without the benefit of appellant's specification***, to make the necessary changes in the reference device." *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984). [Emphasis added.]

Indeed, when both the teachings of Hasegawa et al and Kumar et al are considered together as a whole, the combination would keep the non-erodible focus ring of Hasegawa et al and add the "plasma catalyst" of Kumar et al either by gas transport of powder 75 containing the catalyst into plasma cavity 60 (as show in Figure 2 of Kumar et al) or the feeding of a plasma catalyst sheet 170 longitudinally into the plasma cavity 165 (as show in Figure 6 of Kumar et al). This combination would preserve the virtues of the non-erodible focus ring of Hasegawa et al and (as the examiner maintains) would allow for the delivery of any desirable additive that a user wishes to add to the plasma.

Hence, the Board will appreciate that a combination of Hasegawa et al and Kumar et al, when considered together as a whole, would **not** lead one of ordinary skill in the art to

modify the focus ring of Hasegawa et al to allow for the delivery of any desirable additive that a user wishes to add to the plasma.

Moreover, the Board will appreciate that more than just the routine selection of elements in the art would be involved here for the person of ordinary skill in the art to modify the art to make a new focus ring out of the plasma catalyst of Kumar et al.

C. With regard to independent Claims 1 and 18, the proposed modification suggested by the Examiner would be contrary to the purpose of Hasegawa et al to provide a uniform etching rate over the entire surface of the substrate to be processed

In the outstanding final Office Action, the Examiner indicated that:

> In the instant case, while Hasegawa et al alone does not teach that the erodible component is a polymeric component, Examiner maintains that one of ordinary skill in the art, *taking the combined teachings of Hasegawa and Kumar et al into consideration*, would have found it obvious, with a reasonable expectation of success in obtaining the predictable and desirable result of ***releasing the active component of Kumar et al by erosion of the passive component of Kumar et al,*** to replace one or both of the focus rings 104, 106 of Figure 1 taught by Hasegawa et al or the focus ring 208d of Figure 8 taught by Hasegawa et al with the ring comprising an active material embedded in a passive material as taught by Kumar et al.

In response, Applicants points out below that all the descriptions in Kumar et al appear to be directed to the introduction of their plasma catalyst for the express purpose of plasma ignition. Kumar et al for example further describe at col. 9 that:

> One method of forming a plasma consistent with this invention can include subjecting a gas in a cavity to electromagnetic radiation having a frequency less than about 333 GHz in the presence of a passive plasma catalyst. A passive plasma catalyst consistent with this invention can include any object capable of inducing a plasma ***by deforming a local electric field*** (e.g., an electromagnetic field) consistent with this invention, without necessarily adding additional energy through the catalyst, such as by applying an electric voltage to create a spark.

Thus, if the plasma catalyst of Kumar et al were placed on a focus ring, the plasma activation medium in the plasma catalyst of Kumar et al would deform the local electric field and thereby affecting the plasma uniformity.

Furthermore, there is no basis to assume that "releasing the active component of Kumar et al by erosion of the passive component" would provide a uniform etching rate over the entire surface of the substrate to be processed. Indeed, it seems more likely that releasing of the reactive species of Kumar et al nearby the periphery of the substrate would likely **distort** the etching rate near the periphery of the substrate.

In either case, the results of this proposed modification suggested by the Examiner would be contrary to the purpose of Hasegawa et al to provide a uniform etching rate over the entire surface of the substrate to be processed. See col. 1, lines 61-64, of Hasegawa et al. The Court in *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) explained that:

> If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.

Here, once again, there is no proper suggestion or motivation for the modification proposed by the Examiner.

D. With regard to independent Claims 1 and 18, Kava et al also teach away from the claimed passive polymeric component configured to erode when exposed to a plasma process in the semiconductor manufacturing system

In the Advisory Action, the Examiner cites "Kava" and states that:

> Kuvar suggests that an electrically insulative coating is suitable for use on a foucus ring, but one of ordinary skill in the art, in combining the teachings of Hasegawa, Kumar, and Kava, could embody those teachings in multiple ways, such as only placing the coating on the surface of the focus

> ring not required to erode and not placing the coating on a surface intended to erode.

It thus appears that the Examiner is now after mailing of the final Office Action making a new art rejection based on the combination of "Hasegawa, Kumar, and Kava."

However, Kava et al (U.S. Pat. No. 5,474,649) also **teach away** from the claimed passive polymeric component configured to erode when exposed to a plasma process in said semiconductor manufacturing system. Kava et al teach a textured focus ring surface which stabilizes and retains residues, not an erodible surface. In Kava et al, the focus ring is textured to maintain a coating on the surface of the focus ring. Kava et al states at col. 3, lines 14-19, that:

> Because a focus ring has proximity to the workpiece/surface substrate and, consequently, is more susceptible to contaminant build-up in plasma etch processing, it is desirable to provide a focus ring which accommodates and stabilizes coatings of contaminant residues and requires less frequency of cleaning.

Thus, Kava et al teach a focus ring that does not erode, which teaches away from the claimed ***polymeric*** component ***configured to erode*** when exposed to a plasma process in said semiconductor manufacturing system.

VIII. Conclusion

Hence, for all these reasons given above, the Board should reverse the rejection under 35 U.S.C. § 103(a).

Indeed, Appellants request on the basis of the arguments presented above that the outstanding grounds for the rejection be reversed.

Respectfully submitted,

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CLAIMS APPENDIX

Claim 1 (Previously Presented): A processing element for a semiconductor manufacturing system, said processing element comprising:

a cylindrical unit including a passive polymeric component and an active component;

said cylindrical unit having a first radially-extending surface and a second radially extending surface opposite the first radially-extending surface, wherein an inside diameter of the cylindrical unit forms an opening for disposition of the cylindrical unit around a substrate position in the semiconductor manufacturing system and the second radially extending surface is a substantially planar surface for disposition on a substrate holder in the semiconductor manufacturing system;

said passive polymeric component configured to erode when exposed to a plasma process in said semiconductor manufacturing system; and

said active component included as a part of said passive component and configured to alter the chemistry of the processing when exposed to the plasma process.

Claim 2 (Withdrawn): The processing element as recited in claim 1, wherein said active component is embedded within said passive component.

Claim 3 (Original): The processing element as recited in claim 1, wherein said active component comprises at least one of a solid material and a liquid material.

Claim 4 (Withdrawn): The processing element as recited in claim 1, wherein said active component comprises an organo-metallic compound.

Claim 5 (Withdrawn): The processing element as recited in claim 4, wherein said organo-metallic compound comprises at least one of yttrium, aluminum, iron, titanium, zirconium, and hafnium.

Claim 6 (Withdrawn): The processing element as recited in claim 4, wherein said organo-metallic compound comprises at least one of yttrium tris hexafluoroacetylacetonate, yttrium tris(2,2,6,6-hexamethyl)-3,5-heptanedionate, yttrium tris diphenylacetylacetonate, 1,2-diferrocenylethane, aluminum tris(2,2,6,6- tetramethyl)-3-5-heptanedionate, aluminum lactate, aluminum-8- hydroxyquinoline, bis(cyclopentadienyl)titanium pentasulfide, bis(pentamethylcyclopentadienyl) hafnium dichloride, zirconium acetylacetonate, zirconium tetra(2,26,6-tetramethyl)-3,5-pentanedionate, zirconium tetra(1,5-diphenylpentane-2-4-dione), ferrocene aldehyde, ferrocene methanol, ferrocene ethanol, ferrocene carboxylic acid, ferrocene dicarboxylic acid, 1,2 diferrocene ethane, 1,3 diferrocene propane, 1,4 diferrocene butane and decamethylferrocene.

Claim 7 (Withdrawn): The processing element as recited in claim 1, wherein said active component comprises an ultraviolet (UV) absorber.

Claim 8 (Withdrawn): The processing element as recited in claim 7, wherein said UV absorber comprises at least one of benzophenone, benzotriazole, and hindered amine stabilizers (HALS).

Claim 9 (Withdrawn): The processing element as recited in claim 1, wherein said active component comprises an antioxidant.

Claim 10 (Withdrawn): The processing element as recited in claim 9, wherein said antioxidant comprises at least one of hindered phenols, aromatic amines, organophosphorous compounds, thiosynergists, hydroxylamine, lactones, and acrylated bis-phenols.

Claim 11 (Original): The processing element as recited in claim 1, wherein said active component comprises a distribution of solid particles encapsulated within said passive component.

Claim 12 (Withdrawn): The processing element as recited in claim 11, wherein said distribution of solid particles within said passive component comprises variations in at least one of a particle size, a particle composition, and a particle concentration.

Claim 13 (Withdrawn): The processing element as recited in claim 1, wherein said processing element is configured to be temperature controlled in order to alter a rate at which said active component is exposed to said plasma process.

Claim 14 (Withdrawn): The processing element as recited in claim 1, wherein said processing element is configured geometrically to affect a rate at which said active component is exposed to said plasma process.

Claim 15 (Withdrawn): The processing element as recited in claim 1, wherein said processing element is cylindrical, and an inner surface of said processing element comprises,

a groove structure formed thereon and configured to expose a substantially constant surface area of said inner surface as said inner surface recedes during erosion by said plasma process.

Claim 16 (Withdrawn): The processing element as recited in claim 1, wherein said passive component comprises at least one of a polymer, a porous polymer, a foam, and a gel.

Claim 17 (Withdrawn): The processing element as recited in claim 16, wherein said polymer comprises at least one of Kapton and polyimide.

Claim 18 (Previously Presented): A semiconductor manufacturing system for processing a substrate using a plasma process, comprising:

a processing chamber configured to facilitate said plasma process;

a substrate holder coupled to said processing chamber and configured to support said substrate;

a gas distribution system coupled to said processing chamber and configured to introduce a process gas to said processing chamber;

a plasma source coupled to said processing chamber and configured to generate a plasma in said processing chamber;

at least one processing element coupled to at least one of said processing chamber, said substrate holder, said gas distribution system, and said plasma source; and

said at least one processing element comprising,

a cylindrical unit including a passive polymeric component and an active component,

said cylindrical unit having a first radially-extending surface and a second radially extending surface opposite the first radially-extending surface, wherein an inside diameter of the cylindrical unit forms an opening for disposition of the cylindrical unit around a substrate position in the semiconductor manufacturing system and the second radially extending

surface is a substantially planar surface for disposition on a substrate holder in the semiconductor manufacturing system,

said passive polymeric component configured to erode when exposed to a plasma process in said semiconductor manufacturing system, and

said active component included as a part of said passive component and configured to alter the chemistry of the processing when exposed to the plasma process.

Claim 19 (Withdrawn): The semiconductor manufacturing system as recited in claim 18, wherein said active component is embedded within said passive component.

Claim 20 (Original): The semiconductor manufacturing system as recited in claim 18, wherein said active component comprises at least one of a solid material and a liquid material.

Claim 21 (Withdrawn): The semiconductor manufacturing system as recited in claim 18, wherein said active component comprises at least one of an organo-metallic compound, an ultraviolet absorber, and an antioxidant.

Claim 22 (Original): The semiconductor manufacturing system as recited in claim 18, wherein said active component comprises a distribution of solid particles encapsulated within said passive component.

Claim 23 (Withdrawn): The semiconductor manufacturing system as recited in claim 22, wherein said distribution of solid particles within said passive component comprises varieties in at least one of a particle size, a particle composition, and a particle concentration.

Claim 24 (Withdrawn): The semiconductor manufacturing system as recited in claim 18, wherein said processing element is configured to be temperature controlled in order to alter a rate at which said active component is exposed to said plasma process.

Claim 25 (Withdrawn): The semiconductor manufacturing system as recited in claim 18, wherein said at least one processing element is configured geometrically to affect a rate at which said active component is exposed to said plasma process.

Claim 26 (Withdrawn): The semiconductor manufacturing system as recited in claim 18, wherein said passive component comprises at least one of a polymer, a porous polymer, a foam, and a gel.

Claims 27 -39 (Canceled)

Claim 40 (Previously Presented): The processing element as recited in claim 1, wherein the passive polymeric component comprises a cylindrical ring.

Claim 41 (Previously Presented): The processing element as recited in claim 1, wherein the passive polymeric component comprises a surface exposed to the plasma process, prior to surface exposure to the plasma process, having a greater area than an opposite surface in contact with a substrate holder surface.

Claim 42 (Previously Presented): The semiconductor manufacturing system as recited in claim 18, wherein the passive polymeric component comprises a cylindrical ring.

Claim 43 (Previously Presented): The semiconductor manufacturing system as recited in claim 18, wherein the passive polymeric component comprises a surface exposed to the plasma process, prior to surface exposure to the plasma process, having a greater area than an opposite surface in contact with a substrate holder surface.

Claim 44 (Previously Presented): The processing element as recited in claim 1, wherein the passive polymeric component comprises an insulating material.

Claim 45 (Previously Presented): The semiconductor manufacturing system as recited in claim 18, wherein the passive polymeric component comprises an insulating material.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.